

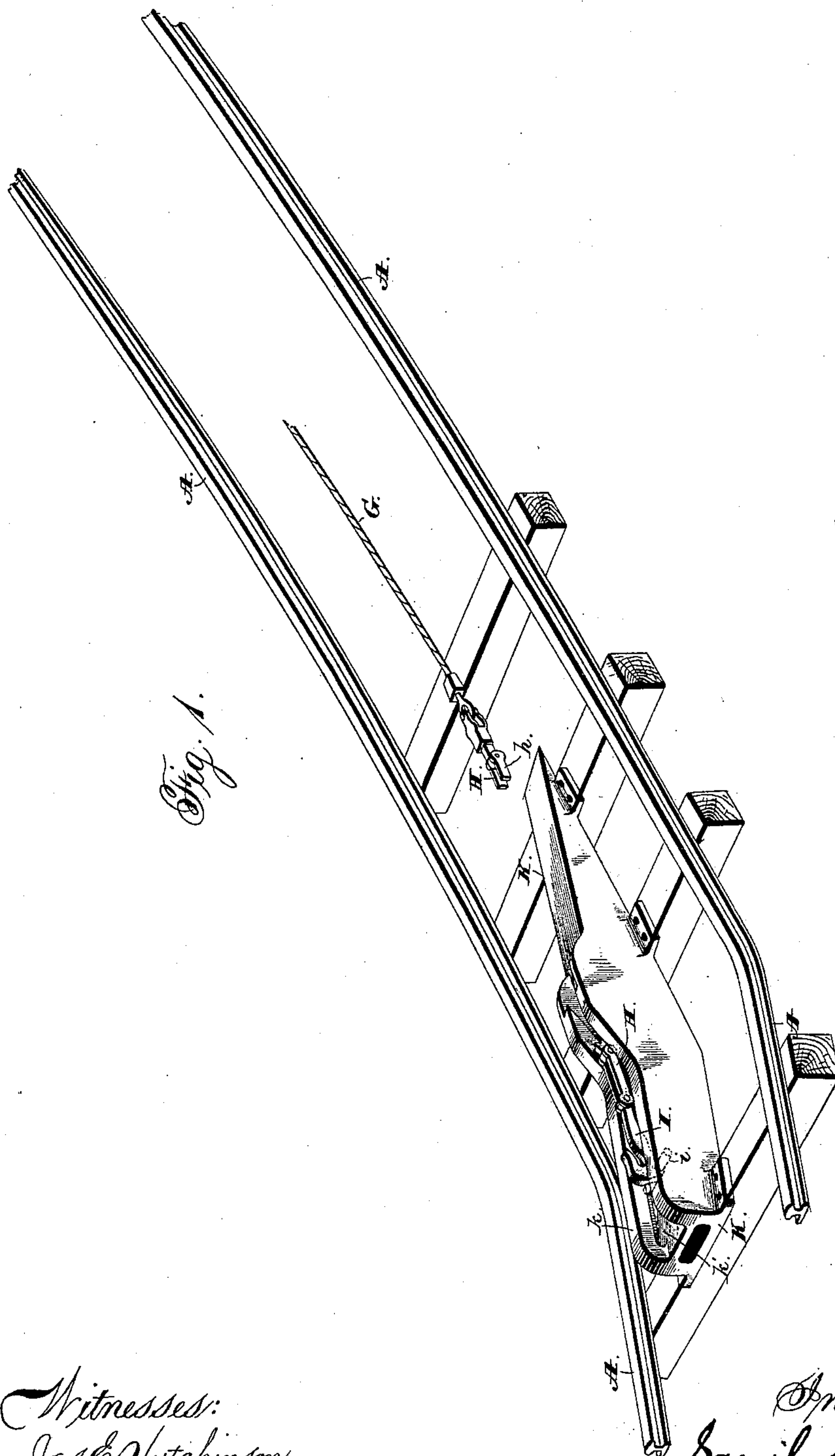
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9 Sheets—Sheet 1.

S. SALMON.
HOISTING APPARATUS FOR MINES.

No. 404,935.

Patented June 11, 1889.



Witnesses:
Jas. E. Hutchinson.
Henry C. Hazard.

Inventor.
 David Salmon, by
 Amos W. Russell, his Attys

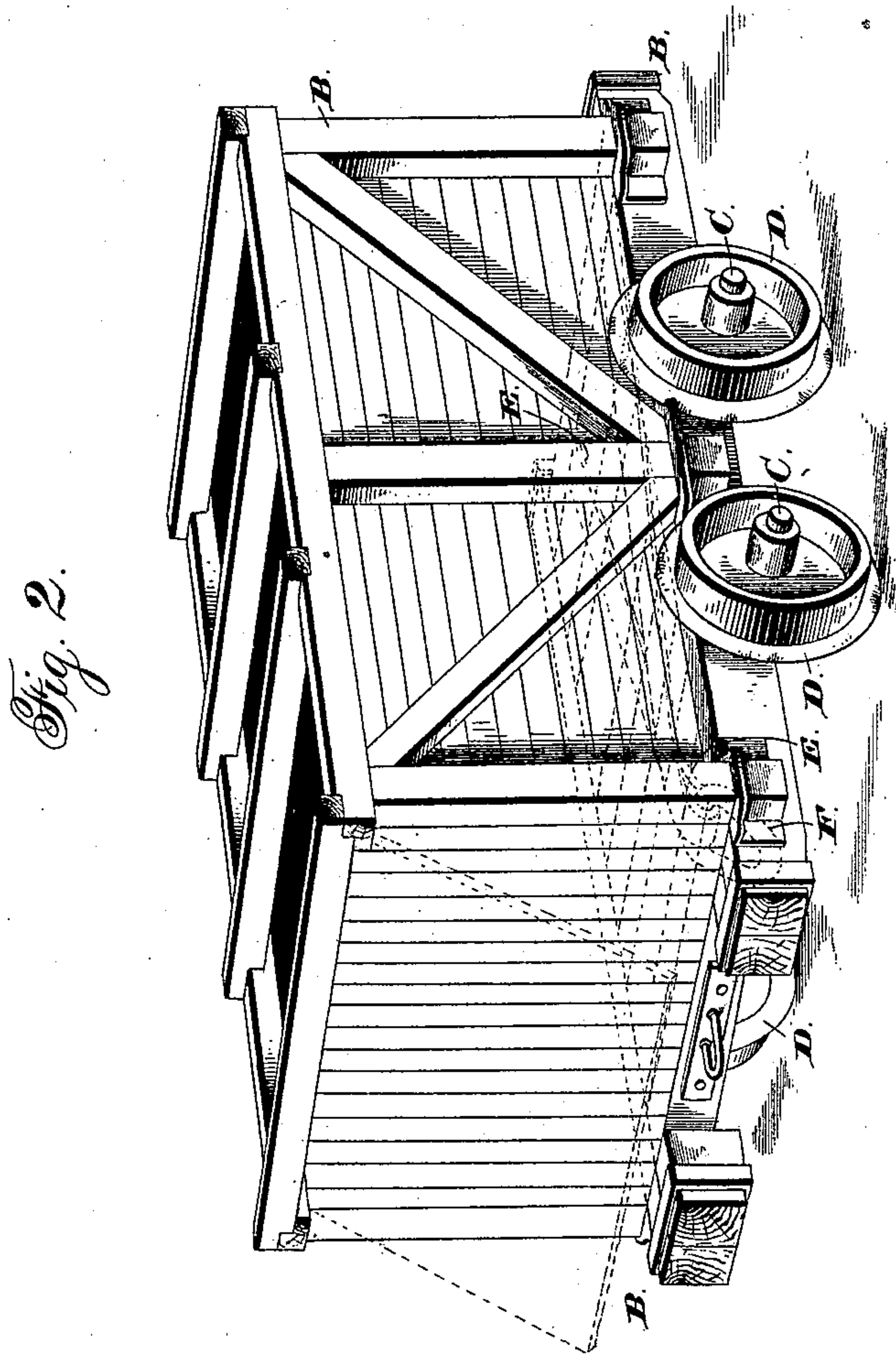
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Inventor:

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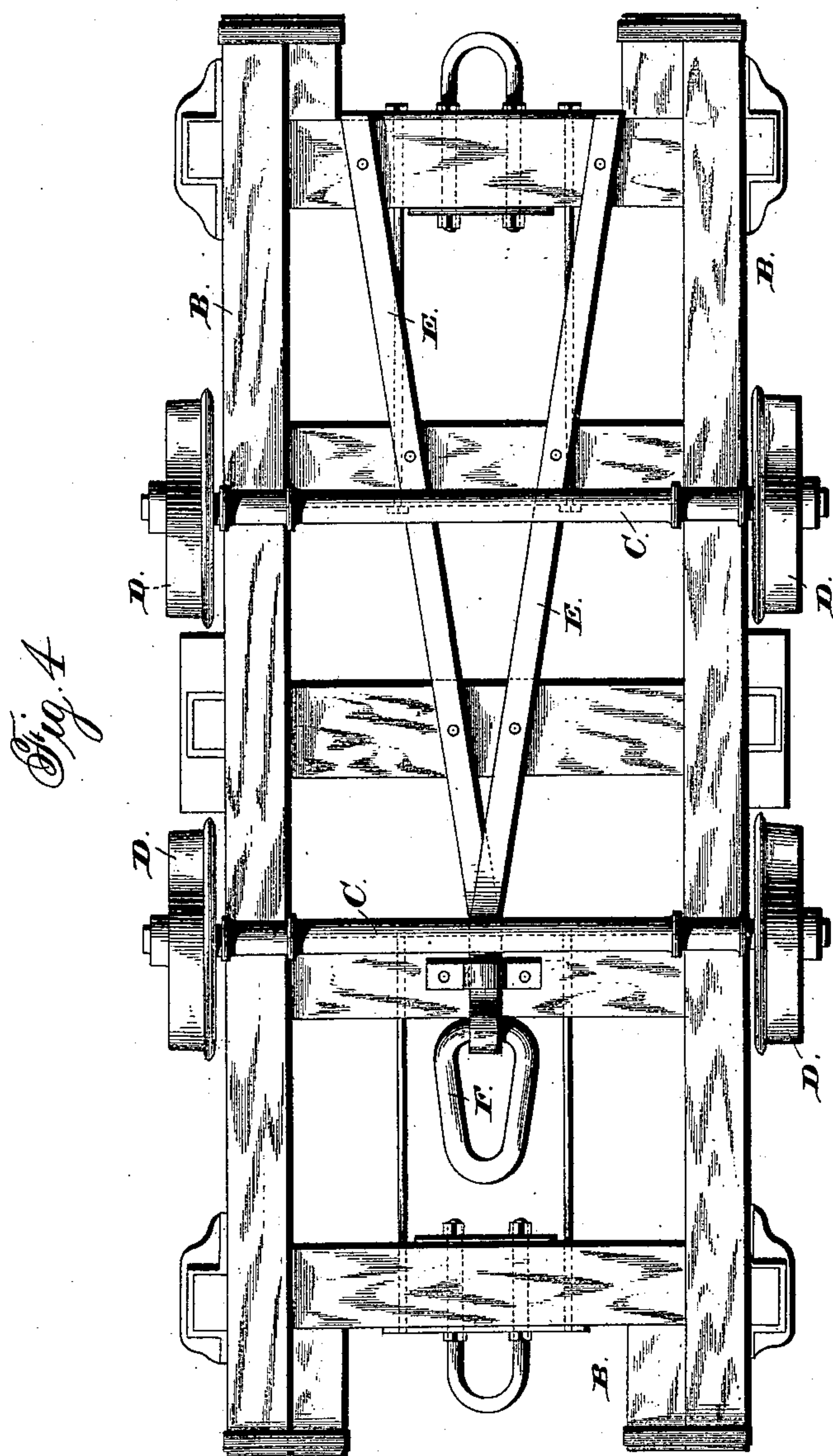
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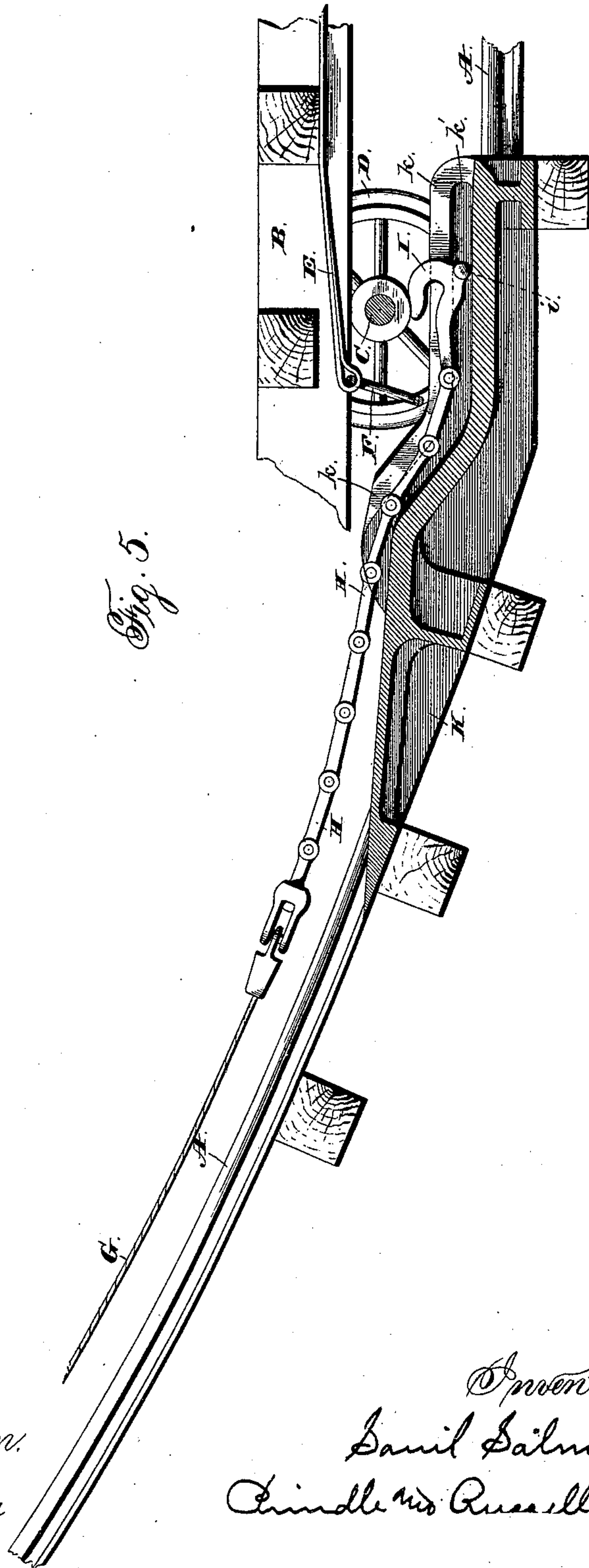
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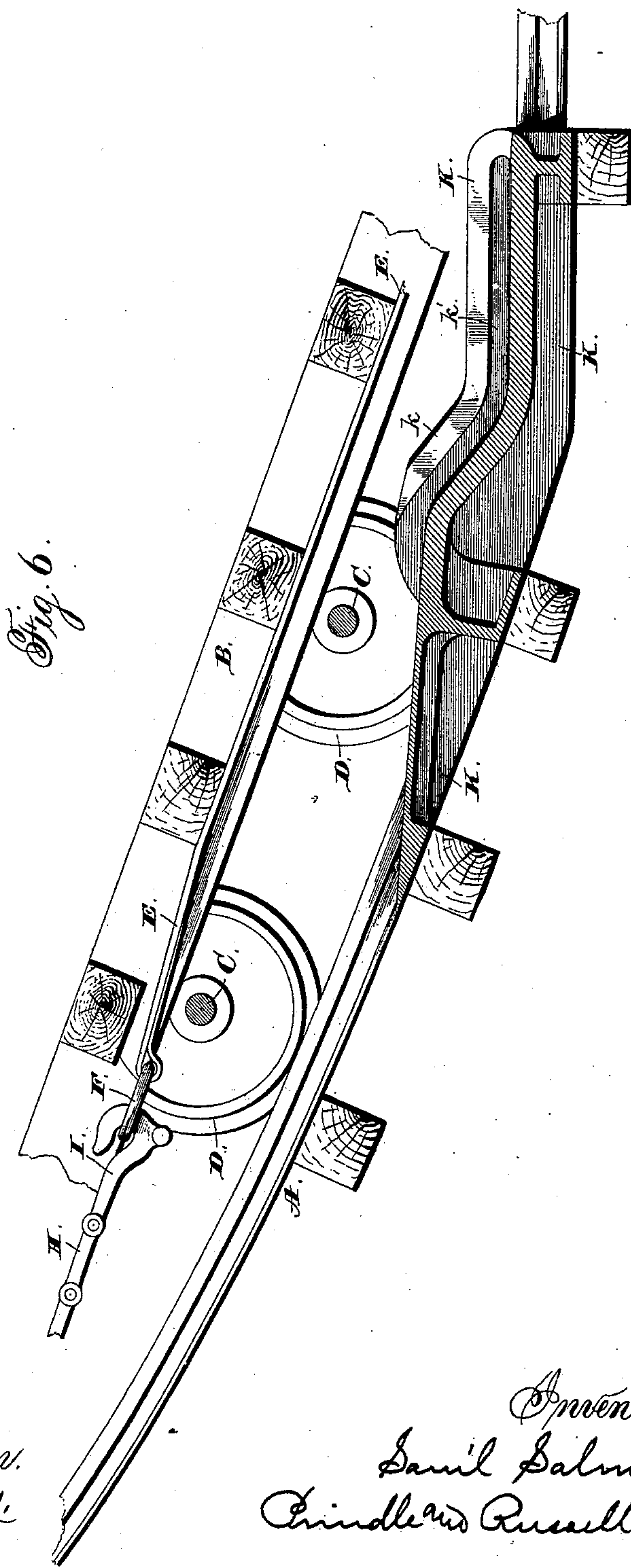
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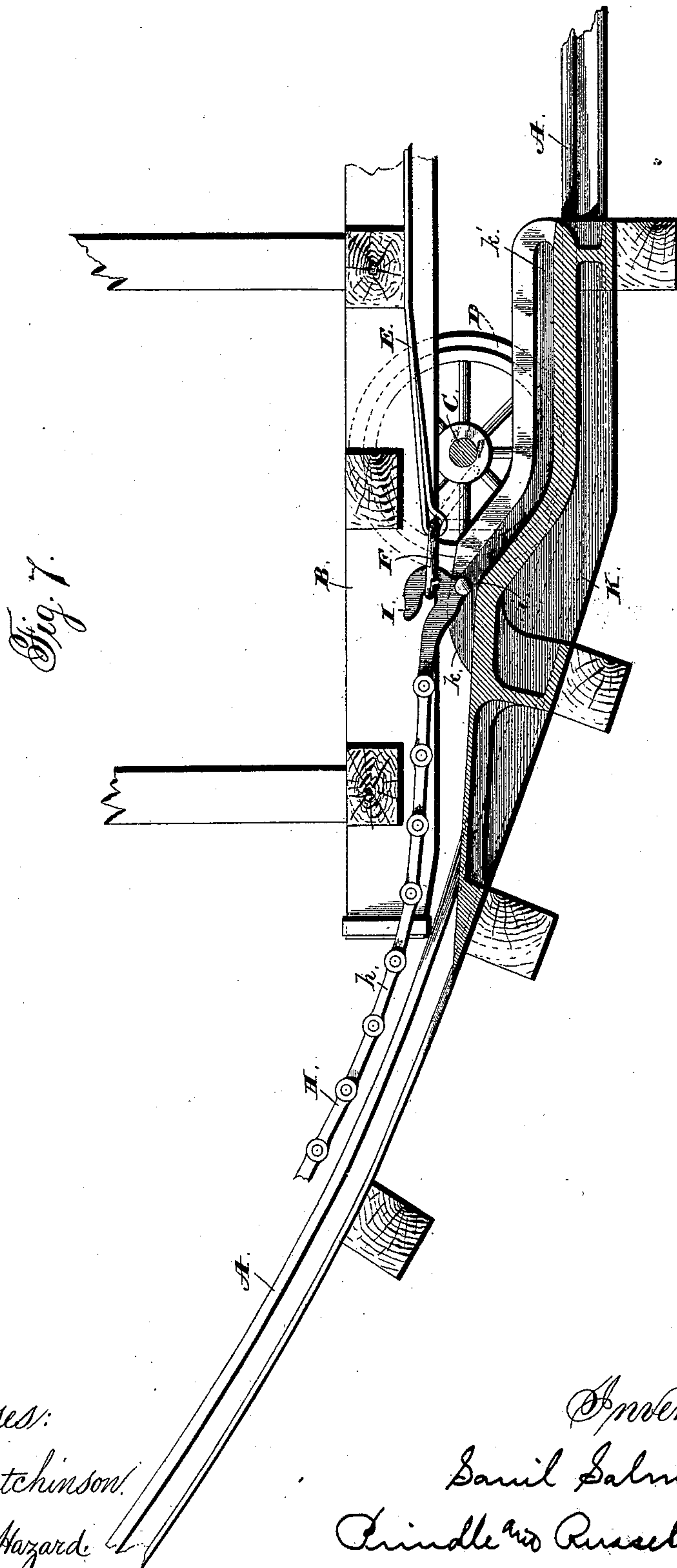
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Fig. 8.

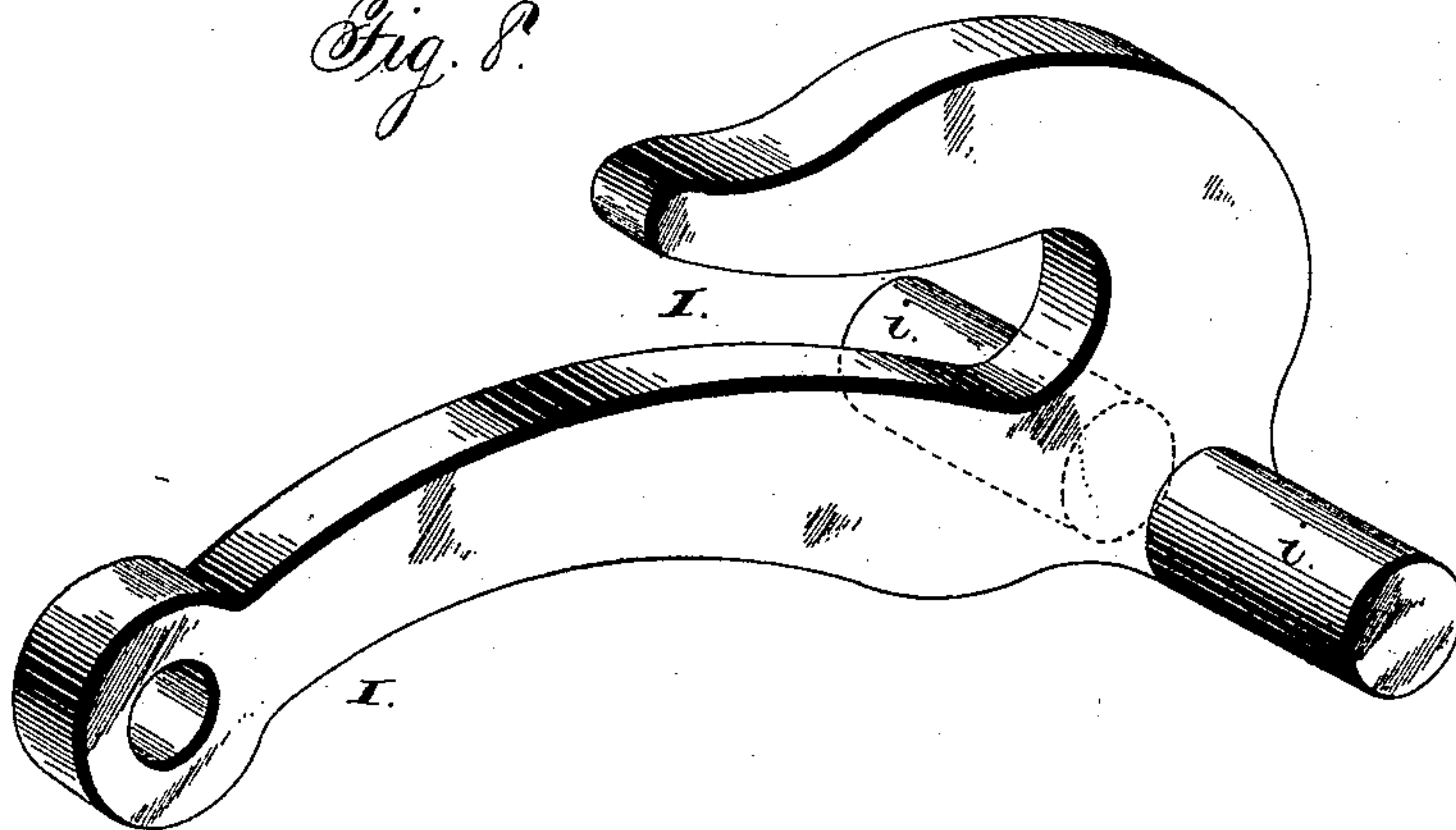


Fig. 9.

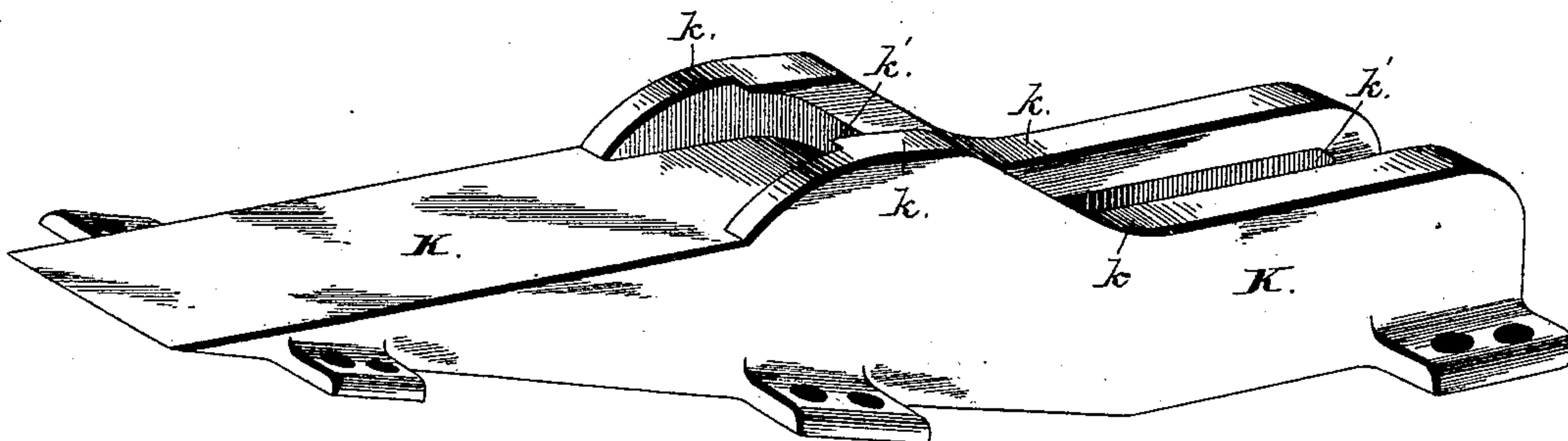
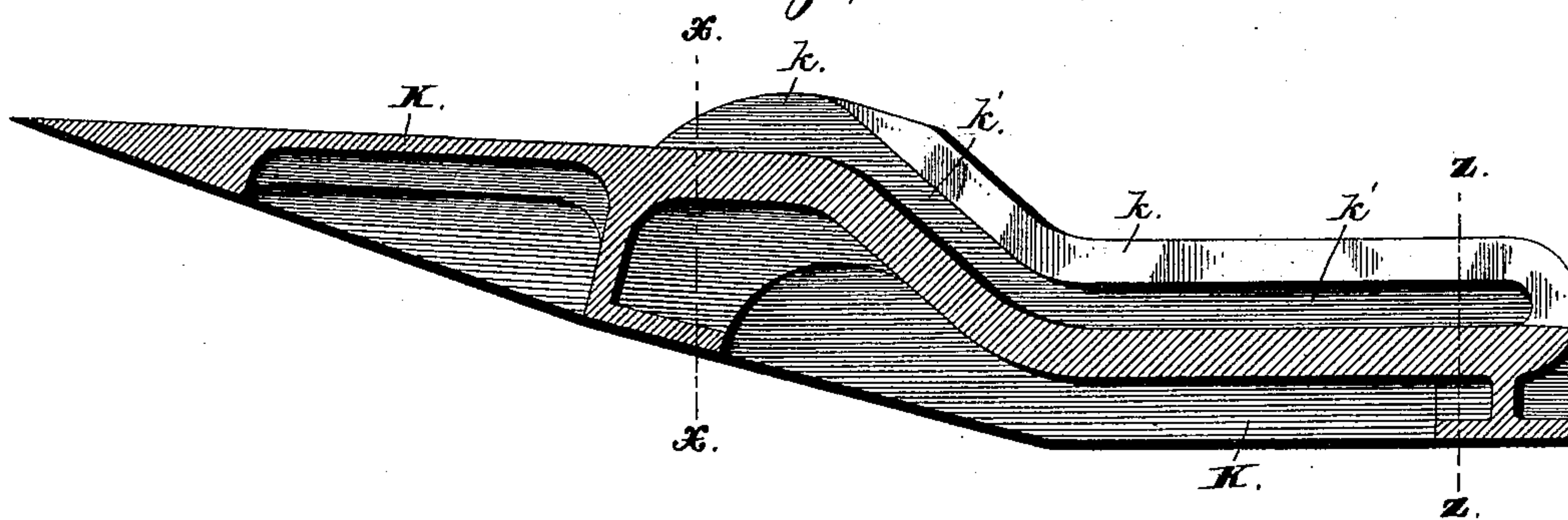


Fig. 10.



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Fig. 11

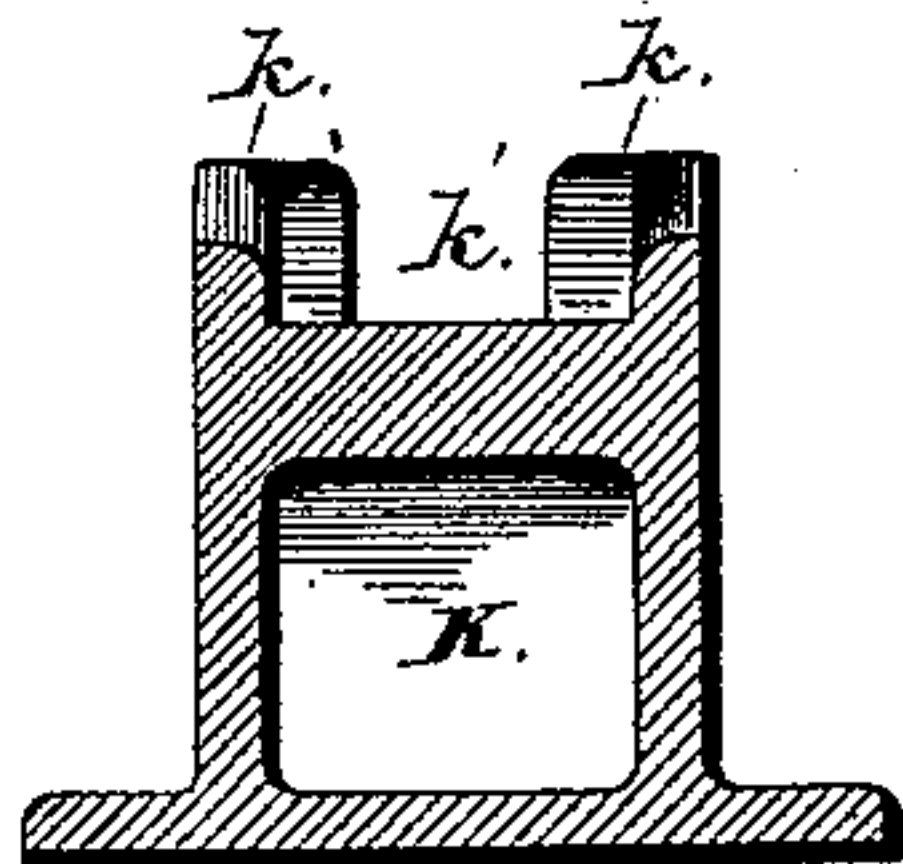
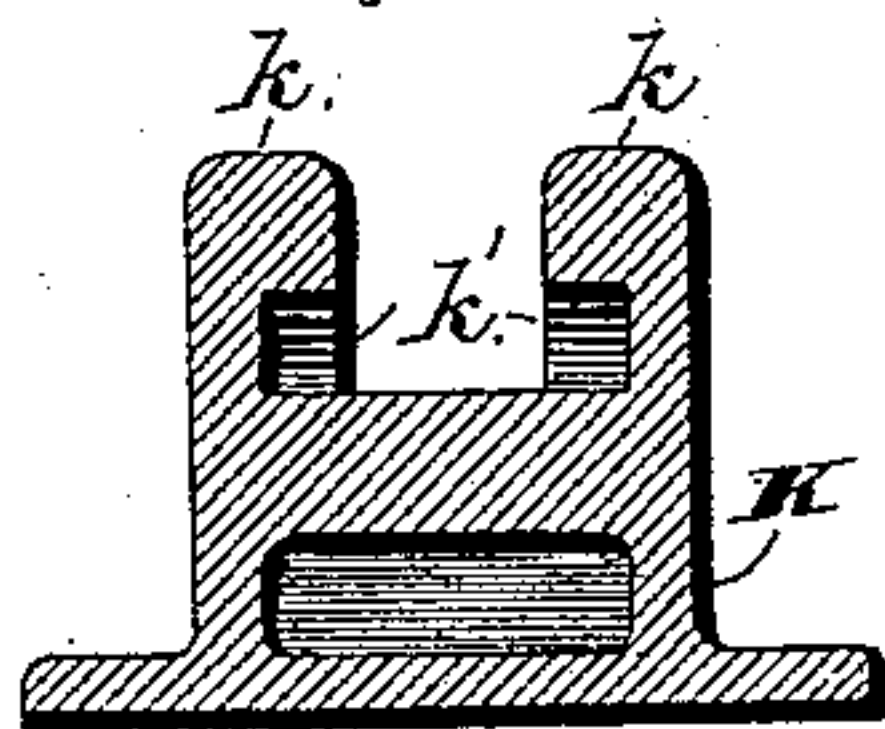


Fig. 12.



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Inventor.

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UNITED STATES PATENT OFFICE.

SAMUEL SALMON, OF DRIFTON, PENNSYLVANIA, ASSIGNOR TO ECKLEY B. COXE, OF SAME PLACE.

HOISTING APPARATUS FOR MINES.

SPECIFICATION forming part of Letters Patent No. 404,935, dated June 11, 1889.

Application filed July 1, 1887. Serial No. 243,127. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL SALMON, of Drifton, in the county of Luzerne, and in the State of Pennsylvania, have invented certain
5 new and useful Improvements in Hoisting Apparatus for Mines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which--

10 Figure 1 is a perspective view of the lower end of a slope, showing my hitching mechanism in position for connection with a mine-car. Fig. 2 is a perspective view of the mine-car. Figs. 3 and 4 are respectively plan views
15 of the upper side of said slope and the lower side of said mine-car. Fig. 5 is a longitudinal vertical section of said parts and shows their relative positions before the hitching-link is engaged by the chain-hook. Fig. 6 is
20 a like view of the same after such engagement has taken place and the car is being drawn up the slope. Fig. 7 is a vertical longitudinal section of said parts, the full lines showing the relative positions of the chain-hook and hitching-link when fully connected
25 together, and the dotted lines various positions of the same between such point and the point of complete disengagement. Fig. 8 is an enlarged perspective view of the chain-hook separated from its connecting parts. Fig. 9 is a like view of the guide or ways employed for turning said hook into or out of engagement with the hitching-link. Fig. 10
30 is a vertical central section of said ways through its longitudinal axis, and Figs. 11 and 12 are cross-sections of the same upon lines $x x$ and $z z$ of Fig. 10.

Letters of like name and kind refer to like parts in each of the figures.

40 In mining operations in which the loaded cars are drawn up a slope and emptied and are then lowered down the slope to be again loaded it has heretofore been necessary that each car should be connected with and dis-
45 connected from the hoisting-cable by hand, which operations have been attended with frequent injury to the limbs or persons of the operators, besides requiring the expenditure of a considerable amount of time.

50 The object of my invention is to obviate these difficulties by causing the hoisting-ca-

ble to be automatically disconnected from an empty mine-car when the latter reaches the lower end of the slope, and to be automatically connected with a loaded car which has
55 been placed in position for movement up the slope, to which end said invention consists in a hoisting apparatus for mines in which a mine-car is automatically detached from the hoisting-cable when it reaches the bottom of
60 the slope, and is automatically connected with said cable when in position for being drawn up the slope, substantially as and for the purpose hereinafter specified.

My invention is intended for use more es-
65 pecially in connection with mines in which coal is drawn outward and upward over an inclined track or slope, and will be illustrated in its application thereto.

In the drawings are shown the lower end of
70 a mine-slope in which is the usual track A, that has a regular inclination from the upper end nearly to the bottom of the slope, and from thence extends in a curve downward and inward until it is merged into the grade
75 of the drift with which said slope connects.

For use upon the track A there are provided mine-cars, each of which consists of a body or frame B, that rests upon and is supported by two axles C and C and four wheels
80 D and D, all of usual construction. To the lower side of the frame A is secured a strong metal band E, within the doubled end of which is placed a link F, that is adapted to swing in a vertical plane which is in a line
85 with the longitudinal axis of the car. Said link is located at the transverse center of said frame slightly in advance of the front axle.

The slope is provided with the usual hoist-
90 ing-cable G, to the lower end of which is attached a short section of chain H, that has flat links h and h , and is made flexible vertically. To the lower end of such chain is piv-
95 oted a hook I, which has the form shown in Fig. 8, and is adapted to be engaged with the link F, when by means of said cable the car may be drawn up or lowered down the slope in the usual manner.

In order that the car may be automatically
100 connected with or disconnected from the hoisting-cable, there is secured midway be-

tween the rails of the track A at the bottom of the slope a guide K, which is shown in Figs. 9 to 12, and consists of a metal plate that is adapted to be secured to or upon three cross-ties, and upon its upper side from its upper end about one-half its length has a plain horizontal face, from thence about one-sixth its length has a downward and inward curve, and from thence to its lower end has substantially the same plane as its upper portion.

From a point slightly above the inclined portion of the face of the guide K to the lower end of said guide a flange *k* projects upward, as shown, from each side, while from the commencement of said incline to said lower end said flange is carried horizontally inward, so as to form upon the remaining portion of the guide a longitudinal groove *k'*, that in cross-section has the form of an inverted letter T. As seen in Fig. 10, the central portion of said groove extends to and is open at the lower end of said guide, while its wide portion terminates a short distance from said end.

The central or vertical portion of the groove *k'* has such width as to permit the body of the hook I, together with the chain H, which is connected to its rear end, to pass freely into and through the same, while the horizontal portion of said groove is adapted to receive and engage two trunnions *i* and *i*, that project laterally from opposite sides of said hook, by which construction it will be seen that as the chain is permitted to pass down the slope the hook, by the action of its trunnions within the guide, is compelled to move sharply downward until, as shown in Fig. 5, it has become disengaged from the link F and is below the lower end of the same, while when said chain is moved in an opposite direction the operation of parts will be reversed and said hook moved upward into engagement with said link.

The operation of the mechanism described is as follows, viz: The hook I being at the lower end of the grooved plate K, a mine-car is pushed along the track until its front wheels are at or near the bottom of the inclined portion of the slope-track, with the link F pendent over the lower end of the sharply-inclined portion of said grooved plate, as shown by Fig. 5, after which, by a longitudinal upward movement of the hoisting-cable, said hook will be drawn in the same direction, and its outer end, by the operation of the groove *k'* and trunnions *i* and *i*, carried upward into engagement with said link, as shown in Fig. 7. When a car is being lowered into the mine, the reverse of the operation described is had. When the hook I reaches the plate K, its trunnions *i* and *i* engage with the groove *k'*, and move the front end of said hook downward until it is detached from the link F, when the car is free to be moved into the drift.

It will be seen that by use of the mechanism described the connecting of a car with

and disconnecting the same from the cable is automatically done, nothing more being necessary than to remove the empty car when it reaches the bottom of the slope and to replace it by a loaded car.

The method of operating inclined railways herein described is not claimed in this application, but is embraced by my application, Serial No. 266,536, filed in the United States Patent Office March 8, 1888.

Having thus described my invention, what I claim is—

1. As an improvement in hoisting apparatus for mines, the combination of a car which is provided with a pivoted pendent link, a hoisting-cable that has pivoted upon its lower end an engaging-hook, and a grooved guide which is located at the lower end of the mine-slope, and is adapted to cause the hook to move beneath the link at an inclination that is greater than the inclination of the track upon which the car rests, substantially as and for the purpose set forth.

2. As an improvement in hoisting apparatus for mines, the combination of a mine-car having a pivoted link, a hoisting-cable, a hook which is pivoted upon the end of such cable, and a guide that engages with the hook as it reaches the lower end of the slope, and operates to move said hook in a plane which has an angle to the plane of the slope at such point, substantially as and for the purpose shown and described.

3. As an improvement in hoisting apparatus for mines, the combination of a hoisting-cable, a hook which is pivoted upon the end of such cable, a mine-car having a pivoted link that is secured upon it and is adapted to be engaged by the hook, and a guide which is located at or near the lower end of the slope and operates to move said hook at an angle to the plane of said car, and thereby cause it to be engaged with or to be disengaged from said link, substantially as and for the purpose specified.

4. As an improvement in hoisting apparatus for mines, the combination of an inclined track, a hoisting-cable, a hook which is pivoted to or upon the end of the same, a mine-car that is adapted to run upon or over such inclined track, and is provided with a pivoted link for engagement by the hook, and a guide which is located at or near the lower end of the slope, and is adapted to move said hook at an angle to the plane of said car to cause it to engage with or to be disengaged from said link, substantially as and for the purpose shown.

5. As an improvement in hoisting apparatus for mines, in combination with a mine-car having a pivoted link, the hoisting-cable provided with a hook, which is pivoted to or upon its lower end, is adapted for engagement with said car-link, and is provided at or near its outer end with laterally-projecting trunnions, and a guide which is located at the lower end of the slope, and is adapted to en-

gage with said trunnions and move said hook out of engagement with the car-link when the car has reached the bottom of the slope, substantially as and for the purpose set forth.

5 6. As an improvement in hoisting apparatus for mines, in combination with a mine-car having a pivoted link, the hoisting-cable provided with a hook, which is pivoted to or upon its lower end, is adapted for engagement with said car-link, and is provided with laterally-projecting trunnions, and a guide which is located at the lower end of the slope, and is adapted to engage with the trunnions and move said hook into engagement with said link as said cable is drawn upward, substantially as and for the purpose shown and described.

7. In combination with a mine-car having a pivoted link and with a hoisting-chain, the hook pivoted at its rear end upon the hoisting-chain and provided at its front end with laterally-projecting trunnions, the guide having a bearing for the pivoted end of said hook, a groove which is adapted to receive the body of the same, and grooves that engage with said trunnions, the arrangement being such that said hook is moved downward with relation to the plane of the inclined track when it passes downward over said guide, and is moved upward with relation to said inclined track when it is drawn upward over

said guide, substantially as and for the purpose specified.

8. The hoisting-cable hook provided with laterally-projecting trunnions at or near its rear end, in combination with the hoisting-cable, the inclined guide-plate, which has a longitudinal T-shaped groove, and a mine-car having the pivoted hoisting-link upon it, substantially as and for the purpose shown.

9. In combination with the track of a mine-slope and with the hoisting-cable thereof, a hook pivoted at one end upon said cable and provided at its opposite end with laterally-projecting trunnions, a guide-plate which is located at the lower end of said slope and has cam-grooves for engagement with said trunnions, and a mine-car having a hoisting-link that is pivoted upon the lower side of it, and is adapted to be engaged with or disengaged from said hook as the latter is moved, respectively, upward or downward over and within said plate, substantially as and for the purpose set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 15th day of June, A. D. 1887.

SAMUEL SALMON.

Witnesses:

HARRY J. DAVIS,

THOMAS O. OBERRENDER.